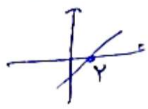
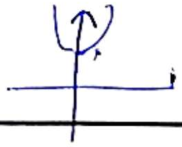
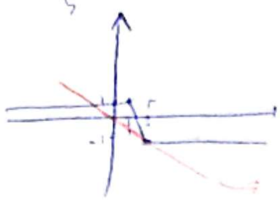
نام و نام خانوادگی آرین عشقی سوادکوهی پاسخنامه تشریحی تکلیف شماره ۴ کلاس ۱۱۲ B

۱	الف) $y=(2(\frac{x}{2}-[\frac{x}{2}]))^2 \to 2(\frac{x}{2}-[\frac{x}{2}]) \to R=[0,2) \xrightarrow{\text{توان ۲}} (2(\frac{x}{2}-[\frac{x}{2}]))^2 \quad R_f=[0,4)$ ب) $\log y=\sin x+4 \to y=\sin x \to R=[-1,1] \to y=\sin x+4 \to R=[3,5]$ $\log y=\underbrace{\sin x+4}_{[3,5]} \quad 5\geq \log y\geq 3 \quad 10^5\geq y\geq 10^3 \quad R_f=[10^5,10^3]$
۲	$\sqrt{\frac{x^2-4}{x^2-9}}=f(x)$ $y=\frac{x^2-4}{x^2-9} \quad x^2 \xrightarrow{x=0} \frac{4}{9} \quad x^2\to\infty \;\; 1 \quad \xrightarrow{\text{ریشه می‌گیریم}} (-\infty,\frac{4}{9}]\cup(1,+\infty)$ $a=0 \quad c=1 \quad b=\frac{2}{3} \quad a+b+c=\frac{5}{3}$ $\to \sqrt{(-\infty,\frac{4}{9}]\cup(1,+\infty)} \to R_f=[0,\frac{2}{3}]\cup(1,+\infty)$
۳	الف) $f(x)=x+\frac{1}{x}+2\sqrt{x+\frac{1}{x}} \to \sqrt{(-\infty,-2]\cup[2,+\infty)}=[\sqrt{2},+\infty) \to [2\sqrt{2},+\infty$ $(-\infty,-2]\cup[2,+\infty) \to D_f=(0,+\infty) \to [2,+\infty) \quad \to R_f=[2+2\sqrt{2},+\infty)$ ب) $y=(3-\sin x)(\sin x+1)=-\sin^2 x+2\sin x+3 \quad R_f=[0,4]$
۴	$f(x)=-\frac{1}{3}x+10 \to D_f=\{1,2,3,4,5,6,7,8,9\} \to R_f=\{\frac{29}{3},\frac{28}{3},\frac{27}{3},\frac{26}{3},\frac{25}{3},\frac{24}{3},\frac{23}{3},\frac{22}{3},\frac{21}{3}\}$ $9\times10-\frac{1}{3}\cdot\frac{9\times10}{2}=75$
۵	$f(x)=\sqrt{ax^2+bx+c} \to D_f=[2,+\infty) \to a=0 \to$  $\sqrt{2b+c}=0 \to 2b+c=0$ $\sqrt{3b+c}=1 \quad 3b+c=1 \to b=1,\ c=-2 \to \sqrt{x-2}=f(x)$ $x-2 \to$  $\sqrt{[0,+\infty)} \Rightarrow R_f=[0,+\infty)$

۶

$|x-2|-|x-1| = kx$



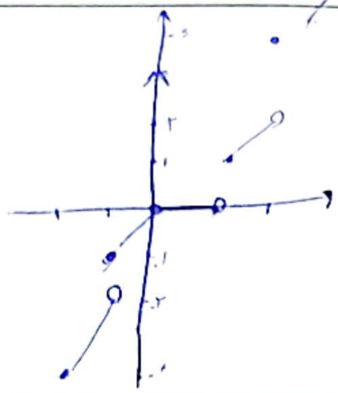
$k = -\frac{1}{2}$

$-\frac{x}{2} = y$ تنها دو بار قطع می‌شود

۷

الف) $y = x[x]$

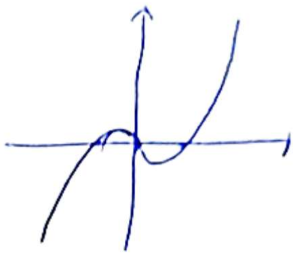
$$\begin{cases} -2x & -2\le x<-1 \\ -x & -1\le x<0 \\ 0 & 0\le x<1 \\ x & 1\le x<2 \\ 4 & x=2 \end{cases}$$



$R_f = (-4,-2)\cup[-1,0]\cup[1,2)\cup\{4\}$

$y = |x|x - x$

$$\begin{cases} x^2-x & x\ge 0 \\ -x^2-x & x<0 \end{cases}$$

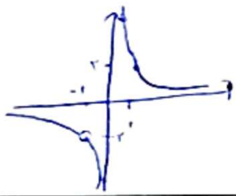


$R_f = \mathbb{R}$

۸

$y = \frac{1}{x} + \frac{1}{x+1} + \frac{1}{x^2+x} = \frac{x+1}{x^2+x} + \frac{x}{x^2+x} + \frac{1}{x^2+x} = \frac{\overset{2(x+1)}{2x+2}}{x(x+1)} = \frac{2}{x}$

$D_f = \mathbb{R} - \{0,-1\}$



$\rightarrow R_f = \mathbb{R} - \{-2, 0\} \rightarrow -2+0 = -2$

۹

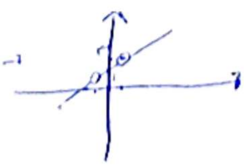
$f(x) = \frac{x-4\sqrt{x}+3}{x-2\sqrt{x}+1} = \frac{(\sqrt{x}-1)(\sqrt{x}-3)}{(\sqrt{x}-1)^2} = \frac{\sqrt{x}-3}{\sqrt{x}-1}$ $\quad +\infty \rightarrow 1,\ 0 \rightarrow 3$ $\quad (-\infty,1)\cup[3,+\infty) = R_f$

$D_f = [0,+\infty) - \{1\}$

۱۰

$f(x) = \frac{x^3+2x^2-x-2}{x^2-1}$ تقسیم می‌کنیم $\rightarrow x^3+2x^2-x-2 \,\big|\, x-1 \rightarrow x^2+3x+2 \rightarrow (x+1)(x+2) \rightarrow \frac{(x-1)(x+1)(x+2)}{(x^2-1)}$

$y = x+2 \rightarrow D_f = \mathbb{R} - \{\pm 1\} \rightarrow$



$R_f = R - \{1, 3\}$

$1+3 = \underline{4}$